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ABSTRACT

This study investigated the effects of data presentation and an educator's level in the organizational hierarchy on the acceptance of educational program evaluation findings. Educational administrators, principals, teachers, and evaluators (n=210) read and rated a simulated evaluation report on a pilot computer literacy program. Four types of presentations were used: no data; percentage data; percentage and graphic data; and percentage graphic, and statistical inference data. Subjects rated the report, the fictitious evaluator, and the level of their agreement with four report recommendations. Responses were analyzed by multivariate analysis of variance and a post hoc discriminant functioning analysis. Results indicated: (1) the method of data presentation had no effect on the subjects' responses; (2) there was a statistically significant effect related to a subject's organizational position; and (3) the interaction between the presentation method and position variables was statistically significant. (BS)

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Program Evaluation Use

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

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Introduction

Educational program evaluation has played an increasingly important role in educational program development in recent years. Some of the expansion of evaluation activities has been due to the demands of external funding sources (Alkin, 1975). Evaluations are also often required by program administrators as a measure of program effectiveness. Finally, the public frequently demands evaluation as an accountability measure. All of these factors have served to increase program evaluation activity in the educational arena (Suchman, 1971).

However, in spite of the increasing demands for program evaluation, the role and purpose of evaluation in education remains unclear. Administrators demand additional evaluative information, yet evaluators constantly complain that their work is not used (Cronbach, Ambron, Dornbusch, Hess, Hornik, Phillips, Walker & Weiner, 1980, p. 45). Part of this problem may be related to the lack of understanding by evaluators of the unique informational need of educational administrators. An examination of the factors involved in determining these needs would help both evaluators and administrators to better do their jobs and improve education.

Information and Educational Administrators

Evaluators in education settings need a clear understanding of the information needs of educational administrators, if they are to be effective forces for encouraging use of evaluative

data. Even in irrational decision-making settings, information may be sought. Information may not be explicitly related to a decision but may nevertheless be pursued on a pro forma basis. In rational settings, information that bears directly on a decision will be required.

Many factors may influence what information is considered pertinent in given decisions. One of these factors may be the position of the decision-maker within the organization. Katz (1955) offered a framework for examining the skills of managers at various levels of the organization. What information is needed to make a decision may vary at different organizational levels, just as needed skills vary. According to Katz (1955), the degree to which each of these skills is necessary for effectiveness varies directly with one's position in the organization. All levels of the organization are thought to need a high degree of human skill. But top management personnel need a high level of conceptual skill while supervisory personnel require more technical skill. Middle management positions require comparable amounts of conceptual and technical skill. Ideally these combinations of skills permit optimum effectiveness for administrators operating at different levels in the administrative heirarchy.

Thus decision-making processes at various organizational levels may require different information in support of decision-making. Moving from one level of the organization to another forces attention to larger units of the organization. The impact

of each decision must be assessed in terms of ever larger organizational units. In education, the teacher is concerned with one class while the principal considers the entire school and the superintendent is responsible for all schools.

The purpose of this study was to examine the impact of data presentations on the acceptance of evaluation findings. Additionally, the effect of different data presentations at four different levels of the organization were studied. Specifically, the objective of the study was to describe reaction to evalaution findings based on data presentation and organizational level. The interaction between data presentation and organizational level was also examined.

Information Use and Data Presentation

Braskamp, Brown and Newman (1978) examined the impact that the evaluator's title, professional background, the part of the program being evaluated, and the client's organizational role status had on client reactions to an evaluator's report. The title and the description of the evaluator influenced the perceptions of objectivity reported by both administrators and teachers. Similarly P. Thompson, Brown and Furgason (1981) explored the impact of jargon and data on the audiences of evaluation. Communication theory was used as a foundation for the study. According to communication theory, several variables influence the impact of a message. These variables include "characteristics of the message source, the context of the

message, the channel of delivery, and the receiver" (pp. 269-270, emphasis in the original).

P. Thompson et al. (1981) examined the impact of various report styles on both lay audiences and professional educators. Whether the report contained jargon or data seemed to have little effect on agreement with the recommendations. The characteristics of the audience had the greatest impact on overall agreement with the recommendations of the evaluator. Educators tended to agree with reports that contained jargon, or data or both. Non-educators registered higher levels of agreement with reports that contained neither jargon nor data. Ratings of the evaluator were determined more by the nature of the report than by the characteristics of the audience. This result indicates the need to examine both the nature of the report and the characteristics of the audience and the interaction between the two.

In a 1982 article, Brown and Newman explored more thoroughly the impact that varying amounts of data have on the use of evaluative information. Since data presentation is a key element of any evaluation report, the presentation should be such that it maximizes the opportunity for communication and impact. Brown and Newman prepared four evaluation reports containing no data, percentage data, percentage data and graphical data, and percentage, graphical and statistical inferences. One of the four treatment conditions was randomly assigned to each of the 64 public school teachers and administrators in the study. After reading one of the four reports, subjects indicated the extent of

their agreement with recommendations of the evaluator. Brown and Newman conclude:

> The audiences in this simulation study agreed most with the evaluator's recommendations when the data were in the form of percentages along with graphs. The simple addition of an inferential statement such as "these differences were statistically significant at the .05 level" however, resulted in lower levels of agreement. In fact, for three of four recommendations, the inclusion of the inferential statement resulted in lower levels of agreement than in the No Data condition (p. 202).

However, since the subjects of this study were graduate students in one university, a more diverse population might provide more conclusive results.

The administrators in the Lorenzen and Braskamp (1978) study indicated that statistical information was not an important factor in their decision-making process. This was confirmed in the study by P. Thompson, Brown and Furgason (1981), where the presence or absence of jargon or data made no difference in agreement with evaluator recommendations. Both of these findings seem consistent with Erickson (1982) who criticizes educators who approach any type of research report with fear and loathing. According to Erickson, these administrators are convinced that either there is nothing to be gained from a research report or that they will not be able to understand the information. Erickson suggests that this results in research information often

being ignored in educational decision-making.

Brown and Newman (1982) obtained results different from Lorenzen et al. and P. Thompson et al. The use of percentage data and graphs increased the acceptance of the evaluator's recommendations. The mention of statistical inferences produced lower levels of agreement with evaluator recommendations. The differences in these results may be related to the fact that the three studies used populations other than school administrators. Similar research with subjects from public school settings needs to be conducted to clarify the impact of statistical information on the acceptance of recommendations in an evaluation report. Clearly, evaluators must use care in electing the report style that is most appropriate for any given audience. In some cases, this will even involve emphasizing qualitative forms of evidence if we want to be credible to administrators (p. 20).

Factors affecting the reasoning of administrators in accepting or rejecting evaluation results are not clear from previous research. Several articles (Braskamp, Brown & Newman, 1982; Brown, Newman, & Rivers, 1980; Newman, Brown & Braskamp, 1980) seem to indicate a lack of consistency in this important area of research. The lack of consensus in the literature suggests this as a fruitful area for additional research.

METHODOLOGY

The effect of various methods of data presentation in simulated evaluation reports was investigated by asking educational administrators, teachers and evaluators to read and

rate these reports. The content of the evaluation reports, the organizational position of the receiver and the interaction between these two independent variables presumably determined the reaction to the reports. These same factors influenced the acceptance or rejection of the recommendations included in the evaluation report.

Subjects

The study was conducted in a large, urban school district in the southern United States consisting of approximately 5000 professional employees. Persons at a variety of administrative and operational levels of the organization were selected to participate in the study. One-hundred forty (140) teachers were randomly selected from a total teaching population of about 4000. The 140 principals selected represent the entire population of elementary and secondary principals in the district. An additional 140 administrators were randomly selected from the central office staff of over 400. Finally, 140 evaluators were randomly selected from the list of all state (LA) certified educational program evaluators. The group sizes were chosen to match the total number of principals available for study.

Each subject was randomly assigned to one of four treatment conditions: (1) no data, (2) percentage data, (3) percentage data and graphs, and (4) percentage data, graphs, and statistical inferences. Simulation reports were delivered through the school system mail network with instructions for returning materials in the same way. However, since most of the selected evaluators were

not part of the school system, their materials were mailed with self-addressed stamped envelopes for the purpose of returning the questionnaires.

Design of the Study

In order to use the simulation method to investigate use phenomena, four different sets of evaluation reports were prepared. Each report described a new computer literacy program that was being piloted in several schools in a fictious school district. The reports contained a description of the program, and four recommendations about the program. The recommendations involved making changes to improve program efficiency and suggestions for expansion of the service in spite of some reservations about the program itself. The recommendations were such that they could be either endorsed or rejected on legitimate educational grounds based on the information in the reports.

All subjects were asked to supply the same background information. Specifically, subjects were asked to provide answers to questions about their position in the organization, educational level, years of experience in education, and the number of college hours accrued in statistics and research. One section of the instrument asked specifically about the subjects' feelings regarding the similarity of the simulation to evaluation reports in their school system.

Instrumentation

Each set of reports was identical, except for the amount and kind of data included in the report. The four data variations were:

1. No data,
2. Percentage data,
3. Percentage and graphic data, or
4. Percentage, graphic and statistical inferences.

These variations follow the pattern used by Brown and Newman (1982). These differing methods of data presentation are legitimate alternatives for evaluators to consider in writing their reports. Knowledge of which method is most effective for a given level of the administrative hierarchy may be valuable information for evaluators.

The "no data" report made references to the types of data that were collected, but presented little information about the results or about the how the information was actually collected. The evaluator merely indicated that the collected data warranted several recommendations. The "percentage" report contained the same narrative and recommendations plus several references to the percentages of participants who achieved previously mentioned objectives. The "percentage" report and the "percentage and graph" report were identical except for inclusion of graphs of the percentage data in the latter report. Finally, the "percentage, graph and statistical" report contained all previous material plus statements about the statistical significance of the accomplishments on each objective.

After reading the simulated evaluation report, each subject was asked to respond to several questions about the evaluator and the report. Using an unnumbered graphic scale, the evaluator was rated on the following dimensions:

1. thoroughness,
2. self-confidence,
3. knowledge of the program,
4. believability,
5. logic,
6. practicality,
7. awareness of local school needs,
8. persuasiveness,
9. objectivity, and
10. report organization.

Each of these dimensions is related to judgment of credibility which is considered important by Alkin and Daillak (1979), Weiss (1972) and others. What was to be measured was the perception of evaluator credibility based on the presentation of the data. This is one of the few factors that the evaluator can control completely.

The participants were also asked to rate the report itself on the following dimensions:

1. usefulness of the information provided,
2. ease of understanding the report,
3. technicality of the report,
4. clarity and organization, and
5. believability.

Finally, all participants were asked to indicate the extent of their agreement with the recommendations in the report. The recommendations suggested changes for the purpose of improving the program and based on the information collected. These ratings too were made using unnumbered graphic scales.

The reliability of the instruments developed for this study was determined through a pilot test. Two classes of graduate students enrolled in educational administration courses participated. Each member of each class was requested to complete one of the four questionnaires. Two weeks later each participant received the same instrument with a new answer sheet. The test-retest reliability coefficient was 0.82 for the 34 subjects involved.

Three null hypotheses were tested:

Hypothesis 1

There will be no statistically significant difference in response to the recommendations and ratings as a result of varying data presentations.

Hypothesis 2

There will be no statistically significant difference in response to the recommendations and ratings as a result of varying organizational roles.

Hypothesis 3

There will be no statistically significant difference in response to the recommendations and ratings as a result of the interaction between the treatment and position variables.

All hypothesis were tested at the .05 level of statistical significance.

ANALYSIS OF THE DATA

Through analysis of the data, hypotheses about the effects of different methods of evaluation information presentation were tested. The responses of people at different levels of the organization were also examined to see if these effects are consistent across organizational levels.

Five dependent variables were analyzed: Recommendations 1-4 and "Rating." "Rating" was a total score calculated by summing scores on the 10 descriptors of the evaluator and the six descriptors of the report. Tables 1-5 present the cell means for each of the five dependent variables involved in the investigation.

The use of a single MANOVA procedure allowed for testing all three hypotheses simultaneously for all five dependent variables without inflating the experimentwise Type I error probability. Table 6 presents the results of the MANOVA for the five dependent variables tested The last column is the calculated probability and is determined by lambda, F and the degrees of freedom. If the p calculated (p) is greater than .05 then the null hypothesis is not rejected. If p is less than .05 then the null hypothesis can be rejected. The calculated probability for the treatment effect is greater than .05, thus Hypothesis 1 cannot be rejected. The calculated probabilities for the position effect and the interaction effect are less than .05, which leads to rejection of Hypothesis 2 and Hypothesis 3.

TABLE 1
CELL MEANS AND STANDARD DEVIATIONS
FOR DEPENDENT VARIABLE: RECOMMENDATION 1

GROUP	TREATMENT	MEAN	SD	N
TEACHER	NO DATA	3.14	2.82	14
TEACHER	PERCENTAGES	2.41	1.93	12
TEACHER	GRAPHS	4.83	3.61	12
TEACHER	STATISTICS	5.15	4.14	13
PRINCIPAL	NO DATA	4.33	3.83	15
PRINCIPAL	PERCENTAGES	4.00	3.13	12
PRINCIPAL	GRAPHS	2.71	2.49	14
PRINCIPAL	STATISTICS	5.23	2.89	13
ADMINISTRATOR	NO DATA	4.53	3.58	15
ADMINISTRATOR	PERCENTAGES	5.78	4.69	14
ADMINISTRATOR	GRAPHS	4.77	4.04	13
ADMINISTRATOR	STATISTICS	6.71	4.89	17
EVALUATOR	NO DATA	6.20	4.60	10
EVALUATOR	PERCENTAGES	8.15	3.83	13
EVALUATOR	GRAPHS	5.50	4.32	12
EVALUATOR	STATISTICS	3.45	2.34	11
ENTIRE SAMPLE		4.83	3.86	210

Note: "1" = strongest agreement; "15" = strongest disagreement.

TABLE 2
CELL MEANS AND STANDARD DEVIATIONS
FOR DEPENDENT VARIABLE: RECOMMENDATION 2

GROUP	TREATMENT	MEAN	SD	N
TEACHER	NO DATA	3.92	3.17	14
TEACHER	PERCENTAGES	4.17	5.18	12
TEACHER	GRAPHS	5.08	3.12	12
TEACHER	STATISTICS	5.23	3.52	13
PRINCIPAL	NO DATA	4.93	3.88	15
PRINCIPAL	PERCENTAGES	4.08	3.63	12
PRINCIPAL	GRAPHS	2.43	2.14	14
PRINCIPAL	STATISTICS	4.77	3.47	13
ADMINISTRATOR	NO DATA	5.60	4.18	15
ADMINISTRATOR	PERCENTAGES	7.07	5.32	14
ADMINISTRATOR	GRAPHS	6.31	4.84	13
ADMINISTRATOR	STATISTICS	6.70	4.57	17
EVALUATOR	NO DATA	7.60	5.10	10
EVALUATOR	PERCENTAGES	8.15	5.40	13
EVALUATOR	GRAPHS	9.00	5.36	12
EVALUATOR	STATISTICS	4.45	3.96	11
ENTIRE SAMPLE		5.58	4.44	210

TABLE 3
CELL MEANS AND STANDARD DEVIATIONS
FOR DEPENDENT VARIABLE: RECOMMENDATION 3

GROUP	TREATMENT	MEAN	SD	N
TEACHER	NO DATA	2.79	2.75	14
TEACHER	PERCENTAGES	3.25	4.18	12
TEACHER	GRAPHS	3.92	2.97	12
TEACHER	STATISTICS	6.46	3.93	13
PRINCIPAL	NO DATA	3.63	3.58	15
PRINCIPAL	PERCENTAGES	3.83	3.07	12
PRINCIPAL	GRAPHS	2.07	1.86	14
PRINCIPAL	STATISTICS	3.84	3.23	13
ADMINISTRATOR	NO DATA	4.93	3.35	15
ADMINISTRATOR	PERCENTAGES	5.43	4.49	14
ADMINISTRATOR	GRAPHS	5.46	4.63	13
ADMINISTRATOR	STATISTICS	6.05	4.34	17
EVALUATOR	NO DATA	6.60	4.55	10
EVALUATOR	PERCENTAGES	7.69	4.48	13
EVALUATOR	GRAPHS	7.75	3.77	12
EVALUATOR	STATISTICS	2.45	2.02	11
ENTIRE SAMPLE		4.75	3.94	210

TABLE 4
CELL MEANS AND STANDARD DEVIATIONS
FOR DEPENDENT VARIABLE: RECOMMENDATION 4

GROUP	TREATMENT	MEAN	SD	N
TEACHER	NO DATA	4.71	2.86	14
TEACHER	PERCENTAGES	4.66	4.54	12
TEACHER	GRAPHS	5.83	4.73	12
TEACHER	STATISTICS	6.85	3.89	13
PRINCIPAL	NO DATA	6.53	4.90	15
PRINCIPAL	PERCENTAGES	7.08	3.75	12
PRINCIPAL	GRAPHS	2.50	1.99	14
PRINCIPAL	STATISTICS	5.38	3.78	13
ADMINISTRATOR	NO DATA	8.07	4.71	15
ADMINISTRATOR	PERCENTAGES	7.21	5.12	14
ADMINISTRATOR	GRAPHS	5.38	4.31	13
ADMINISTRATOR	STATISTICS	9.41	3.59	17
EVALUATOR	NO DATA	9.40	4.65	10
EVALUATOR	PERCENTAGES	8.69	4.71	13
EVALUATOR	GRAPHS	10.41	3.80	12
EVALUATOR	STATISTICS	6.09	4.74	11
ENTIRE SAMPLE		6.76	4.52	210

TABLE 3
CELL MEANS AND STANDARD DEVIATIONS
FOR DEPENDENT VARIABLE: "RATING"

GROUP	TREATMENT	MEAN	SD	N
TEACHER	NO DATA	68.79	35.70	14
TEACHER	PERCENTAGES	68.75	39.16	12
TEACHER	GRAPHS	107.42	43.99	12
TEACHER	STATISTICS	104.08	45.20	13
PRINCIPAL	NO DATA	87.40	41.29	15
PRINCIPAL	PERCENTAGES	73.42	43.81	12
PRINCIPAL	GRAPHS	67.07	27.77	14
PRINCIPAL	STATISTICS	105.85	38.67	13
ADMINISTRATOR	NO DATA	93.33	43.94	15
ADMINISTRATOR	PERCENTAGES	90.57	44.91	14
ADMINISTRATOR	GRAPHS	73.61	31.13	13
ADMINISTRATOR	STATISTICS	115.41	49.45	17
EVALUATOR	NO DATA	109.60	44.65	10
EVALUATOR	PERCENTAGES	110.92	56.85	13
EVALUATOR	GRAPHS	101.75	42.81	12
EVALUATOR	STATISTICS	87.82	36.87	11
ENTIRE SAMPLE		92.09	44.01	210

Note: The lowest possible "rating" score was 16 (16 descriptors X 1). The highest possible "rating" score was 240 (16 descriptors X 15).

TABLE 6
MANOVA RESULTS

SOURCE	LAMBDA	F	df	p CALCULATED
TREATMENT	0.93	0.95	15/524.9	0.51
RECOMMENDATION 1	—	(0.76)	(3/194)	(0.52)
RECOMMENDATION 2	—	(0.12)	(3/194)	(0.95)
RECOMMENDATION 3	—	(0.28)	(3/194)	(0.84)
RECOMMENDATION 4	—	(1.02)	(3/194)	(0.38)
TOTAL RATING	—	(2.27)	(3/194)	(0.08)
POSITION	0.83	2.4	15/524.9	0.00
RECOMMENDATION 1	—	(3.87)	(3/194)	(0.01)
RECOMMENDATION 2	—	(6.69)	(3/194)	(0.00)
RECOMMENDATION 3	—	(6.51)	(3/194)	(0.00)
RECOMMENDATION 4	—	(7.71)	(3/194)	(0.00)
TOTAL RATING	—	(2.17)	(3/194)	(0.09)
2-WAY INTERACTION	0.72	1.44	45/853.0	0.03
RECOMMENDATION 1	—	(2.11)	(9/194)	(0.03)
RECOMMENDATION 2	—	(1.32)	(9/194)	(0.23)
RECOMMENDATION 3	—	(2.86)	(9/194)	(0.00)
RECOMMENDATION 4	—	(2.52)	(9/194)	(0.01)
TOTAL RATING	—	(2.13)	(9/194)	(0.03)

Note: univariate values are presented in parentheses.

A discriminant analysis procedure was used as a post hoc test to discover the causes of the statistically significant differences. Tables 7-10 present the results of this analysis. In Table 7, the discriminant function coefficients for each variable are presented along with the variables' structure coefficients. The former gives the coefficients for combining the variables in a meaningful way to discriminate maximally among the four positions. The structure coefficients are the correlations between the variable and the discriminant function equation. Table 8 depicts the group centroids for each of the positions on the first discriminant function. These values suggest which of the four groups are similar and dissimilar with respect to the first discriminant function, which is related to the test of Hypothesis 2. Teachers and principals seem to respond most similarly with administrators in the middle and the evaluators being most different from the others.

The other statistically significant finding was the interaction between the position and treatment variables. The results of the discriminant function analysis of this interaction are presented in Tables 9 and 10. Table 9 presents the function coefficients for the five variables with the structure coefficients for each. Table 10 presents the group centroids for the 16 possible groups.

TABLE 7
POST-HOC DISCRIMINANT FUNCTION ANALYSIS
CRITERION VARIABLE : POSITION

VARIABLE	STANDARDIZED FUNCTION COEFFICIENTS	STRUCTURE COEFFICIENTS
RECOMMENDATION 1	0.13	0.57
RECOMMENDATION 2	0.45	0.78
RECOMMENDATION 3	0.17	0.74
RECOMMENDATION 4	0.64	0.81
RATING	-0.10	0.43

TABLE 8
GROUP CENTROIDS
CRITERION VARIABLE : POSITION

GROUP	CENTROIDS
TEACHERS	-0.33
PRINCIPALS	-0.43
ADMINISTRATORS	0.26
EVALUATORS	0.53

TABLE 9
POST-HOC DISCRIMINANT FUNCTION ANALYSIS
CRITERION VARIABLE : POSITION x TREATMENT

VARIABLE	STANDARDIZED FUNCTION COEFFICIENTS	STRUCTURE COEFFICIENTS
RECOMMENDATION 1	0.04	0.60
RECOMMENDATION 2	0.05	0.64
RECOMMENDATION 3	0.53	0.78
RECOMMENDATION 4	0.58	0.81
RATING	0.09	0.54

TABLE 10
GROUP CENTROIDS
CRITERION VARIABLE : TREATMENT x POSITION

GROUP	CENTROIDS
NO DATA x TEACHER	-0.66
NO DATA x PRINCIPAL	-0.22
NO DATA x ADMINISTRATOR	0.22
NO DATA x EVALUATOR	0.71
PERCENTAGE x TEACHER	-0.61
PERCENTAGE x PRINCIPAL	-0.16
PERCENTAGE x ADMINISTRATOR	0.19
PERCENTAGE x EVALUATOR	0.81
GRAPHS x TEACHER	-0.22
GRAPHS x PRINCIPAL	-1.10
GRAPHS x ADMINISTRATOR	-0.12
GRAPHS x EVALUATOR	1.01
STATISTICS x TEACHER	0.29
STATISTICS x PRINCIPAL	0.29
STATISTICS x ADMINISTRATOR	-0.30
STATISTICS x EVALUATOR	-0.46

SUMMARY

This study investigated the effects on evaluation use of differing methods of information presentation and audience levels in the organizational heirarchy. Four types of data presentations were used: (1) no data, (2) percentage data, (3) percentage and graphic data, and (4) percentage, graphic and statistical inference data. Subjects represented four different organizational levels: teachers, principals, school administrators and educational evaluators.

The subjects (n=210) were randomly selected and randomly assigned to the information presentation conditions. Each participant was asked to respond to demographic questions concerning experience, education and research background. The treatment condition was presented by means of four simulated evaluation reports concerning a fictitious computerized reading improvement course. After reading the report, the subjects were asked to indicate the level of their agreement with four recommendations made based on the evaluation. Additionally, participants were asked to rate both the evaluator and the report on variety of criteria.

Five dependent variables were derived from the four recommendations and the combination of the ratings on the descriptors. The responses were analyzed by the MANOVA procedure and a post hoc discriminant function analysis. The analysis indicated that the data presentation treatment had no effect on the responses of the subjects. There was a statistically

significant effect related to the position of the individual in the organization. There was also a statistically significant interaction between the treatment and position variables. The results were interpreted in terms of implications for educational evaluators and for other educational administrators who serve in an advisory capacity.

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